10.0
Developed Areas Vegetation

Urban forestry and the landscaping of developed areas can affect both the quality of life for Fort Belvoir residents and the quality of the natural resources on Fort Belvoir. On the installation, a "campus quad" appearance is maintained on the South Post Core Area, and clustered development on the Upper North Post is designed to preserve large areas of open space (Woolpert, 1995). While aesthetics are an important concern to this installation, it is desirable and possible to manage developed areas vegetation with sound stewardship principles in mind. The management of developed areas on Fort Belvoir can result in energy conservation, preservation of historic and specimen trees, grounds maintenance cost savings, beautification and increased property values, improved living and working conditions, soil conservation, enhancement of water supplies, runoff and nonpoint sources of pollution control, and good land stewardship.

Natural plant communities that are located within the developed areas of Fort Belvoir provide numerous benefits to people and wildlife. They can serve as valuable islands of habitat for common wildlife associated with urban areas. In areas where plant communities are contiguous, they may serve as small corridors for migratory species that pass through developed areas. Vegetation in these areas helps reduce the ambient air temperature, thus reducing energy costs during the warmest months and providing a more pleasant living environment. Trees absorb sunlight, preventing the ground from excessive heating and cooling the air directly through evapotranspiration. Vegetation is valuable within developed areas because of beneficial effects on pollution. Grassy areas can reduce and retain stormwater flow from impervious surfaces like roofs and parking lots, while also filtering out pollutants such as toxics and nutrients. Vegetation also provides cleaner air by absorbing carbon and some pollutants. Native vegetation areas on developed land often require little or no management, and therefore can effectively reduce the amount of pesticides and herbicides applied. These areas can also provide varied opportunities for recreation, thus improving quality of life for residents and visitors on Fort Belvoir.

As of 2000, about 30% of Fort Belvoir's Main Post and EPG consists primarily of improved and semi-improved grounds associated with the administrative, housing, community service facilities and golf courses on post. Management actions in the improved and semi-improved areas focus on maintaining aesthetics and function. Management generally includes landscaping, turf management, and urban tree management.

10.1 DEVELOPED AREAS VEGETATION POLICIES

10.1.1 Federal Developed Areas Vegetation Policy

Executive Order 13148 *Greening the Government through Leadership in Environmental Management* contains overarching direction regarding management of vegetation in developed areas. The order directs federal agencies to strive to promote the sustainable management of

federal facility lands through the implementation of cost-effective, environmentally sound landscaping practices, and through programs to reduce adverse environmental impacts. The Order requires agencies to incorporate the Guidance for the 1994 Presidential Memorandum on *Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds* into landscaping programs, policies, and practices (60 Fed. Reg. 40837). This memorandum directs agencies to adopt the following principles where cost-effective and to the extent practicable:

- Use regionally native plants for landscaping.
- Design, use, or promote construction practices that minimize adverse effects on the natural habitat.
- Seek to prevent pollution by, among other things, reducing fertilizer and pesticide use, using integrated pest management techniques, recycling green waste, and minimizing runoff.
- Implement water-efficient practices, such as the use of mulches, efficient irrigation systems, audits to determine exact landscaping water-use needs, and recycled or reclaimed water and the selecting and siting of plants in a manner that conserves water and controls soil erosion. Landscaping practices, such as planting regionally native shade trees around buildings to reduce air conditioning demands, can also provide innovative measures to meet the energy consumption reduction goal established in Executive Order No. 12902, "Energy Efficiency and Water Conservation at Federal Facilities."
- Create outdoor demonstrations incorporating native plants, as well as pollution prevention and water conservation techniques, to promote awareness of the environmental and economic benefits of implementing this directive. Agencies are encouraged to develop other methods for sharing information on landscaping advances with interested non-federal parties.

Other federal regulations that guide undeveloped vegetation management on Fort Belvoir include the following:

- The Federal Noxious Weed Act of 1974 (7 U.S.C. §§ 2801-2814) prohibits the import or movement of nonindigenous weeds that have the potential to interfere with the growth of useful plants, clog waterways, interfere with navigation, cause disease, and that generally are detrimental to agriculture, commerce, and public health, unless pursuant to a permit. The Act prohibits the sale, purchase, barter, exchange, taking, or giving of a noxious weed in violation of the Act. The Act also requires each federal agency to develop a management program to control undesirable plants on federal lands when a similar state program is in place. Where applicable, federal agencies are to enter into cooperative agreements with state agencies to coordinate the management of undesirable plant species on federal lands.
- Executive Order 13112, *Invasive Species*, establishes duties for federal agencies concerning the detection and control of invasive species. To the extent possible, installations should work to prevent introductions of invasive species, control detected

populations, accurately monitor populations, restore native species and habitats affected by invasive species, and promote public education on invasive species and their control.

- The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) (7 U.S.C. 136 et seq.) affords vegetation protection by emphasizing pest management using biological, cultural, chemical, and physical tools in a manner that minimizes economic, health, and environmental risks.

- The Plant Quarantine Act (7 USC 15 1-164a, 167) calls for the Animal and Plant Health Inspection Service (APHIS) to regulate the importation and interstate movement of nursery stock and other plants that may carry harmful pests and diseases.

- The Federal Plant Pest Act (7 USC 150aa-150jj) prohibits the movement of plant pests from a foreign country into and through the U.S., unless permitted by the Secretary of Agriculture. The APHIS has broad authority to inspect, seize, quarantine, and destroy potentially harmful plant and animal materials.

- The Organic Act of 1944 (7 USC 147a, 148, 148a-e) authorizes the APHIS to detect, eradicate, suppress, control, prevent, or retard the spread of plant pests.

10.1.2 State Developed Areas Vegetation Policy

Virginia has no overarching policy to guide the management of vegetation in developed areas. However, the Virginia Noxious Weed Law (Code of Virginia, Title 3.1, Chapter 17.2), relates to plants and seeds used in landscaping. This law prohibits the movement, transport, delivery, shipment, or offering for shipment into or within Virginia of any noxious weed, without a permit from the Commissioner of Agriculture and Consumer Services. The law calls for the Board of Agriculture and Consumer Services to establish implementing regulations; however, to date no regulations have been promulgated. A number of related guidance documents and fact sheets have been issued by the Virginia Department of Conservation and Recreation, Natural Heritage Program; for example, Natural Heritage Technical Report 98-25, *Managing Invasive Alien Plants in Natural Areas, Parks, and Small Woodlands*; Virginia National Heritage Program Fact sheet, *What are Invasive Alien Plant Species and Why are They a Problem?*; and Virginia National Heritage Program Fact sheet, *Invasive Alien Plants List.*

The Virginia Pesticide Control Act (Title 3.1, Chapter 14.1 of the Code of Virginia) confers powers and authority on the Virginia Pest Control Board to develop regulations that restrict or prohibit the sale or use and disposal of any pesticide or pesticide container or residuals that are toxic or hazardous to humans or wildlife, or may adversely affect the environment. The Board is to consult with the Virginia Department of Environmental Quality concerning compliance with applicable waste management regulations for disposal of pesticides concentrates and pesticide containers; the Virginia Department of Labor and Industry concerning safe working conditions for pest control and agricultural workers; and the Department of Game and Inland Fisheries concerning standards for the protection of wildlife and fish. Under the Act, the Board also is to require that pesticides are adequately tested and are safe for local uses and that individuals who sell, store, or apply pesticides commercially are properly trained.

10.1.3 Department of Defense Developed Areas Vegetation Policy

Although the Department of Defense (DoD) has no overarching instruction regarding management of vegetation in developed areas, several of its instructions touch upon aspects of such management. DoD's natural resources management policy is contained within DoDI 4715.3, *Environmental Conservation Program*. It states that "Environmentally and economically beneficial landscaping practices shall be used on all DoD lands… Each installation shall, to the extent practical, use regionally native plants for landscaping and other beneficial techniques."

DoD Directive 4700.4, *Natural Resources Management Program*, states that "Costs for maintaining grounds shall be minimized by providing the least amount of mowed areas and special plantings necessary to accomplish management objectives and by the use of low maintenance species, agricultural outleases, wildlife habitat, and tree plantings."

DoD's pest management policy is contained within DoDI 4150.7, *Department of Defense Pest Management Program.* This instruction implements the policy established under DoDI 4715.1, *Environmental Security*, to:

- Establish and maintain safe, effective, and environmentally sound integrated pest management (IPM) programs to prevent or control pests and disease vectors that may adversely impact readiness or military operations by affecting the health of personnel or damaging structures, materiel, or property. (4.1)

- Ensure DoD pest management programs achieve, maintain, and monitor compliance with all applicable Executive Orders and applicable federal, state, and local statutory and regulatory requirements. (4.2)

- Incorporate sustainable IPM philosophy, strategies, and techniques in all aspects of DoD and Component vector control and pest management planning, training, and operations including installation pest management plans and other written guidance to reduce pesticide risk and prevent pollution. (4.3)

Excerpts from DoDI 4150.7 that are applicable to installation pest management programs are presented below.

Excerpts from DoDI 4150.7 Select Provisions Applicable to Pest Management in Developed Areas
■ Develop, maintain, annually review, and revise their pest management plans consistent with the program elements in enclosure 4 and [Armed Forces Pest Management Board] AFPMB Technical Information Memorandum (TIM) 18, "Installation Pest Management Guide," February 1987. (5.3.22.1)
■ Implement pest management programs approved by pest management consultants and performed by certified pesticide applicators in accordance with the pest management plan written for each installation. (5.3.22.2)

Excerpts from DoDI 4150.7
Select Provisions Applicable to Pest Management in Developed Areas

(continued)

- Establish pest management self-help programs for military housing when cost effective and when IPM monitoring indicates a need for a self-help program. (5.3.22.3)
- Have all pesticide applications to DoD installations made only by properly trained and certified personnel in accordance with DoD Plan for the Certification of Pesticide Applicators of Restricted Use Pesticides…or by State-certified applicators. (5.3.22.4)
- Use pesticides in accordance with applicable laws including FIFRA…(5.3.22.5)
- Use only pesticides that have been approved by a DoD pest management consultant. Consideration should be given to locally purchased pesticides to ensure conformance with State management plans for ground water protection and to facilitate use of recyclable pesticide containers when appropriate pesticides are not available in the Federal supply system. Pesticides may be procured locally if needed for an emergency, if required due to unique local situations, or if required in quantities so small that assignment of an NSN is not practical. (5.3.22.6)
- Maintain complete daily pesticide application and pest management operations records as required by FIFRA…and 7 U.S.C. 136i-1…or for pest management measures of merit, using DD Form 1532-1 or a computer-generated equivalent. Produce a monthly summary, using DD Form 1532 or computer-generated equivalent, to provide data for regulatory, DoD, Federal, State, or local agency data calls; component program review and oversight; and Measures of Merit…(5.3.22.7)
- Use pest management contracts when more cost-effective than in-house services. Ensure that firms and their employees performing contract pest management work on DoD installations, and in support of DoD operations overseas, comply with all certification, licensing, and registration requirements of the State or county where the work is performed. Ensure that the technical portions of contracts involving pest management reflect IPM methodology and are reviewed and approved by a DoD pest management consultant before solicitation. (5.3.22.8)
- Have quality assurance evaluators…who have been trained in pest management at DoD-sponsored courses, inspect pest management operations and pesticide applications performed by contractors. (5.3.22.9)
- Report pest management operations and pesticide applications performed by contractors… (5.3.22.10)

10.1.4 Department of the Army Developed Areas Vegetation Policy

The Department of the Army's (DA's) natural resources management policy is contained within AR 200-3, *Natural Resources–Land, Forest and Wildlife Management*. This regulation establishes the DA's requirements for managing and using land and water resources in accordance with the principles of ecosystem management. Excerpts from AR 200-3 are provided below.

Excerpts from AR 200-3
Select Provisions Applicable to Developed Areas Vegetation Management

- The natural resources management professional will be an active participant in all planning and decision making activities regarding uses of the land to ensure that current and planned mission activities (for example, master planning, construction requests, site approval requests, and training exercise plans) are conducted in a manner which is compatible with natural resources and other environmental requirements. (3-2b)

- Grounds will be maintained at the levels and intensities necessary to meet the designated use criteria, protect, and enhance the natural resources, and ensure a pleasing appearance in harmony with the natural landscape. Designated turf areas will be maintained (renovated, seeded, aerated, fertilized, and irrigated) to the degree required to maintain a permanent vegetative cover of desirable plants necessary to support the intended use. Guidance available from local agricultural agencies and universities will be used in determining the most adapted species of vegetation and the maintenance practices necessary to meet the designated use. Improved grounds will be maintained at a level comparable with similar public facilities in the area. The Army Community of Excellence and self-help programs are to be an integral and active force in grounds maintenance/landscape improvements and installation beautification initiatives. The appropriate environmental directorate is to provide technical guidance and approved materials to all interested occupants, building managers, tenants, as well as other personnel interested in improving the living and working areas on the installation. (4-1a)

- Costs for maintaining grounds will be minimized by providing the least amount of mowed area and landscape plantings necessary to accomplish management objectives and by the use of low maintenance species, agricultural leases, reforestation, natural areas, and wildlife habitat. Standards for maintenance of all categories of grounds will comply with TM 5-630. (4-1b)

- All planting, pruning, cultivation, and other maintenance will conform to criteria in TM 5-63O, ANSIZ60 standards, and the approved Installation Design Guide. (4-8a)

- Trees and shrubs will be removed if they have become terminally plagued by insect or disease problems, high maintenance costs, health or safety hazard to persons or property, or have become non-complementary to architectural features of the building area. (4-8b)

- Justification and merits for landscape and urban forestry expenditures in the urban ecosystem include: energy conservation, preservation of historic and specimen trees, grounds maintenance cost savings, beautification and increased property values, increased species and habitat biodiversity, improved living and working conditions, soil conservation, enhancement of water supplies, control of runoff and non-point sources of pollution, and good land stewardship. (4-8c)

- Landscaping will be functional in nature, simple and informal in design, meet professional standards for species, design and installation; be compatible with adjacent surroundings, and complementary to the architectural features and the overall natural setting of the area. Formal landscape designs will be limited to specific high visibility areas including main building and road entrances, ceremonial areas, and other special use sites as warranted. Emphasis will be on the use of low maintenance indigenous plants. Normally not more than one-fourth of an individual foundation perimeter will be planted with shrubs or trees. In arid and semi-arid areas, use water efficient (xeric) plants. A viable Landscape Planting Plan will be an integral part of the Integrated Natural Resources Management Plan Installation Design Guide under the Master Plan. (4-8d)

Excerpts from AR 200-3
Select Provisions Applicable to Developed Areas Vegetation Management

(continued)

- All landscape plantings will be compatible with other grounds maintenance requirements and will be coordinated with, reviewed, and approved by the Facility Engineer, Master Planning, utilities, and the natural resource manager. Painting or white-washing of tree trunks and stones is not authorized. (4-8h)

- When flowerbeds are an important cultural landscape feature of the community, they may be planted and maintained as a facilities engineering activity but should be limited to the main entrance to the installation, headquarters, or in areas used for ceremonial purposes. When authorized, flower beds will be laid out in accordance with a planting and maintenance plan to ensure that
  1. Costs are minimized by an appropriate mixture of perennials, annuals, and indigenous wildflowers.
  2. Plant materials are compatible with the site, exposure, and growing zone; and exotic species or plant materials that serve as an attractant or host to pests are not used.
  3. Acquisition and/or maintenance costs are reasonable.
  4. Indigenous and cultivable threatened and endangered species are to be given primary consideration. (4-8i)

- Landscape plans and actions in significant historic sites or districts will be reviewed for their potential effect according to AR 420-40 [now AR 200-4], chapter 3. (4-8j)

- The integrated urban forest ecosystem encompasses many environments, disciplines, and concepts. This includes open lands, water, and vegetated areas in and adjacent to improved and semi-improved grounds as well as woodland borders. The urban forest includes individual trees as well as groupings and small tracts scattered among more dominant land uses. Multiple use of this resource must occur within and among this complex system of interspersed land uses. Urban forests are valued primarily for their non-consumptive contributions to our everyday lives and the environment in which we live. See Landscape Plantings, chapter 4, paragraph 4-8c. Wood products and volumes from an urban tree are usually identified only for salvage operations (4-9a)

- An Urban Forest Management Plan will be an integral part of and integrated with the Installation Master Plan, and the natural resource management plan. The plan should include professional standards (National Arborist Association, American Association of Nurseryman "American Standard for Nursery Stock," Council of Tree and Landscape Appraisers "Guide for Plant Appraisal"), technical specifications, training, certification, and requirements for all actions impacting the planting, growth, and survival of all trees in the urban forest ecosystem. This includes specific standards for planting, pruning, fertilizing, removal, utility clearance, and integrated pest management; the identification, protection, and preservation of historic and specimen trees; and the training, licensing, and certification of personnel and contractors. (4-9b)

- All applicable installations with a land management program will have a Command Tree Policy Directive and/or Tree Ordinance that identifies and provides specific requirements, authorization, and approvals for excavation permits, tree removals, and liabilities for unauthorized tree removal and damage. (4-9c)

AR 200-5 *Pest Management* implements the requirements listed above for DoDI 4150.7. The regulation seeks to protect health, property, and natural resources from damage by insects, weeds, and other pests in ways that promote training and readiness with a minimum risk to the environment. The regulation promulgates policies, responsibilities, and procedures to implement the Army Pest Management Program, and supplements the federal, state, and local laws described in AR 200-1 for the Army Environmental Program. In implementing DoDI 4150.7, each installation's Department of Public Works must prepare and annually update a pest management plan. The plan should list all program objectives, prioritized according to the potential or actual impact on health, morale, structures, or property. The current Fort Belvoir Integrated Pest Management Plan was approved and signed by the Major Army Command (MACOM) and the Garrison Commander in December of 1998.

10.1.5 Fort Belvoir Developed Areas Vegetation Policy

Fort Belvoir has no overarching policy regarding developed areas vegetation management on-post. It does, however, have several policies pertaining to specific aspects of vegetation management (e.g., tree protection during construction, pest management). Fort Belvoir's installation-specific natural resources management policies are contained within the Fort Belvoir Supplement to AR 200-3 (dated February 20, 1996) (Appendix H). Fort Belvoir's *Tree Removal and Protection Policy* (Appendix I), based on the urban forest management requirements in Fort Belvoir's Supplement to AR 200-3, outlines requirements and criteria for tree protection and replacement. The *Tree Removal and Protection Policy* promotes "site planning techniques and construction practices that maximize retention and protection of existing trees before considering removal." It requires that "…all proposed tree and shrub removals as well as construction and excavation activities that may impact the growth and survival of trees are to be approved by the DIS." The policy also requires that "Two new trees are to be planted for each tree 4 inches and larger in diameter… removed through construction on Fort Belvoir."

Fort Belvoir *Integrated Pest Management Policy*, 200-04-00 dated 24 January 2000 requires planning that incorporates "education, recordkeeping, and best management practices to prevent pests and diseases from damaging property" (Appendix K). It also requires that all pest management operations on Fort Belvoir are carried out in accordance with the Fort Belvoir Integrated Pest Management Plan and applicable federal, state, and local laws (U.S. Army, 2000b). The policy letter designates ENRD as the responsible party for pest management compliance on Fort Belvoir, which enables it to enforce its requirements.

10.1.6 Chesapeake Bay Program

DoD and DA are signatory partners of the Chesapeake Bay Program (CBP). The 1987 *Chesapeake Bay Agreement*, the 1990 *Cooperative Agreement Between DoD and EPA Concerning Chesapeake Bay Activities*, the 1993 *DoD/EPA Action Items for the Chesapeake Bay Program*, the 1994 *Agreement of Federal Agencies on Ecosystem Management in the Chesapeake Bay*, the 1998 *Federal Agencies' Chesapeake Ecosystem Unified Plan (FACEUP)*, and the renewed Chesapeake Bay agreement, *Chesapeake 2000*, contain specific goals, objectives, and commitments designed to provide for the restoration and protection of the Bay's living resources and their habitats. In particular, the 1994 *Agreement of Federal Agencies on Ecosystem Management in the Chesapeake Bay* states that federal agencies agree to aid in the

reduction of toxic loadings to the Chesapeake Bay and its tributaries by using "BayScapes" and other successful programs to expedite compliance with the president's directive on environmentally and economically beneficial landscaping practices on federal facililities in the Bay watershed. In addition, the CBP's 1998 *Federal Agencies Chesapeake Ecosystem Unified Plan* commits federal signatory agencies to expand conservation landscaping practices on their facilities through the development and implementation of new specifications and design criteria. Other elements of the plan include model lease provisions for federal facilities that address Chesapeake Bay stewardship goals, the implementation of integrated pest management on 75% of federally-owned facilities in the Bay watershed, and the development of nutrient management plans that address agricultural, construction, turf, golf course and recreation, and other developed federal lands. The *Chesapeake Bay Basinwide Toxics Reduction and Prevention Strategy*, signed in 1994, commits DoD and DA to reduce or eliminate chemical contaminants to the Bay from controllable sources, such as applications of pesticides. The *Toxics 2000 Strategy* renews this commitment and sets new goals for reducing the impacts of chemical contaminants.

10.2 BASELINE DEVELOPED AREAS VEGETATION CONDITIONS

As of 2000, Fort Belvoir has completed the following surveys in installation developed areas (Table 9.1):

- Plant community survey and mapping
- Urban forest inventory and mapping
- Improved grounds mapping
- Invasive/exotic vegetation survey and mapping (including developed and undeveloped areas).

10.2.1 Plant Community Survey

The installation-wide plant community survey (Section 9.2.1) designated all developed areas at Fort Belvoir as urban land. Urban land consists of improved and semi-improved grounds including buildings, landscaped areas, the airfield, and golf courses. The vegetation is characterized by a wide variety of landscaped trees and shrubs, tall fescue grass, and Kentucky bluegrass (*Festuca arundinacea*) (Paciulli, Simmons and Associates, Ltd., 1998a; 1999a).

10.2.2 Urban Forest Inventory

An urban forest inventory was completed for the installation in 2000 (Davey Resource Group, 2000). The inventory data includes recording locations, species, and sizes of urban trees on the installation. The inventory data are included in the installation GIS. The urban forest inventory also includes management recommendations that will be incorporated into the current and future Real Property Maintenance Contract for grounds maintenance.

10.2.3 Improved Grounds Vegetation Inventory

Fort Belvoir maintains an inventory of improved grounds (flower beds and mowed areas) on the installation GIS and through the Real Property Maintenance Contract. As of 2000, Fort Belvoir has 18 flower beds totaling 2.6 acres, 720.2 acres of improved mowed areas, and 35.4 acres of semi-improved mowed areas (Bartley, 2000).

10.2.4 Invasive Exotic Vegetation Survey

The installation-wide invasive/exotic vegetation survey included species occurring on the unimproved areas, and on the edges of the improved areas of the installation (Paciulli Simmons and Associates, 2000b). Table 9.4 presents a summary of the 14 invasive/exotic vegetation species on Fort Belvoir with significant occurrences to warrant consideration for control. Table 9.4 also summarizes the location and size of each occurrence and the type of habitat in which it exists. The locations of problematic occurrences of invasive and exotic vegetation are being incorporated into the installation GIS.

10.3 DEVELOPED AREAS VEGETATION MANAGEMENT

10.3.1 Developed Areas Vegetation Conservation Recommendations

As of 1999, Fort Belvoir has existing management plans for improved grounds (as implemented through the Real Property Maintenance Contract), urban forest, and invasive/exotic vegetation. Fort Belvoir's developed areas management will continue to focus on sustaining and enhancing the installation's urban forest resources, and on providing grounds maintenance services. Key installation-wide management actions will continue to emphasize the following:

- Minimizing tree loss to new construction and to operations and maintenance activities, and mitigating unavoidable losses
- Implementing a mowing reduction strategy for the installation
- Performing urban forest management (e.g., street tree planting)
- Performing pest management in accordance with the installation Integrated Pest Management Plan
- Performing invasive/exotic vegetation management.

10.3.2 Developed Areas Vegetation Management Actions to Date

Fort Belvoir manages its vegetation resources in the developed areas in accordance with the requirements of DoDI 4715.3, DoDI 4150.7, DoDD 4700.4, and AR 200-3. Fort Belvoir's natural resources management program has focused on balancing the aesthetic and functional requirements with sound stewardship principles. The developed areas vegetation management component of Fort Belvoir's natural resources program has multiple environmental benefits including saving energy and reducing stormwater flow, filtering out pollutants such as nutrients

and toxics, and reducing the use of pesticides, herbicides, and fertilizers. The program also contributes to improving the quality of life for the Fort Belvoir community by enhancing the natural setting on post.

10.3.2.1 Developed Areas Vegetation Conservation

Fort Belvoir has institutionalized standards and practices to minimize tree losses resulting from excavation, development and maintenance actions. The Fort Belvoir *Tree Removal and Protection Policy* establishes requirements and criteria for tree protection and replacement including a two-for-one replacement of all trees lost to new construction (U.S. Army, 1998a). The Fort Belvoir *Excavation Work* policy letter (U.S. Army, 1998b) through the excavation permit process requires ENRD review and approve all land disturbing actions. The ENRD reviews all designs for new construction and facility renovations including site clearing and layout to minimize vegetation/tree losses. Proposed planting plans are also reviewed to ensure that appropriate plant materials and planting strategies are proposed.

10.3.2.2 Grounds Maintenance Management

Government specifications in the Real Property Maintenance Contract prescribe standards for managing improved grounds (turf, trees, and landscape beds) on Fort Belvoir. This includes requirements for the flower species to be planted and the level of overall flowerbed care (e.g., fertilizing, weeding mulching, watering, addition of compost and tilling). Fort Belvoir's management actions for flower beds have focused on minimizing intensive planting and maintenance operations, and enhancing the planting of native species.

Mowing and leaf removal specifications in the Real Property Maintenance Contract for improved areas that are typically in highly visible locations, and for semi-improved areas that are in less visible locations reflect land use changes, current activities, and the protection and preservation of natural resources. The specifications include standards and criteria for mowing height and frequency, turf repair and re-establishment, liming and fertilization, landscaping, and tree care. A postwide mowing reduction program begun in 1998 has resulted in the removal of 70 acres from the intensive mowing and leaf removal schedule. Improved tree protection and health was a major factor in the decision to do so. Under the mowing reduction program, designated areas are either removed from mowing or are mowed only when site conditions warrant. All turf areas are reviewed annually for mowing and leaf removal modifications. In determining mowing modifications, the aesthetics, costs, area uses, environmental impacts, and equipment needs are factors that are considered.

10.3.2.3 Urban Forest Management

Urban forest management on Fort Belvoir has focused on maintaining tree cover and controlling pests. The *Urban Forest Management Plan* is a component of the Real Property Maintenance Contract. The plan specifies routine care for urban trees including health diagnosis, treatment, pruning, removal, transplanting and fertilization.

10.3.2.4 Invasive/Exotic Species Management

The *Invasive/Exotic Vegetation Management Plan* (Paciulli, Simmons and Associates, Ltd., 2000b) provides strategies for identifying and controlling occurrences of problematic invasive/exotic vegetation on post, and reducing the risk of introducing new problem species or spreading species to new locations. Both unimproved and improved grounds are included in the plan. Plan components include monitoring for occurrences of problematic species, tracking occurrence(s), determining the need for treatment, determining the appropriate treatment regime, and monitoring success of treatments. The plan also includes institutional controls to safeguard against future introductions of invasive/exotic vegetation species.

Invasive/exotic vegetation management to date has focused on eradicating existing priority invasions of exotic species. Projects that have been completed in the developed areas include the following:

- Cutting back kudzu along the Potomac River at the Officers' Club
- Treating Japanese bamboo (*Phyllostachys* spp.) at various locations (e.g., Accotink Bay Wildlife Refuge entrance)
- Controlling phragmites at a number of sites bordering Accotink Bay and Dogue Creek
- Removing purple loosestrife (*Lythrum salicaria)* at Tully Gate, the Youth Center, and other locations in the improved area.

10.4 CONTINUING AND FUTURE DEVELOPED AREAS VEGETATION MANAGEMENT

Fort Belvoir's vision for the future is to continue the management emphasis and actions addressed in Section 10.3. Fort Belvoir will continue to implement urban forest management and landscaping practices in the developed areas that contribute to both the quality of life for Fort Belvoir residents and the quality of natural resources on post. The management emphasis will continue to be in accordance with established DoD and DA policies, as well as with commitments in the various Chesapeake Bay Program agreements. These commitments include nutrients and toxics reduction, conservation landscaping, and integrated pest management. Fort Belvoir recognizes that sound management of developed areas can result in numerous benefits, including energy conservation, preservation of historic and specimen trees, increased beautification, improved living and working conditions, soil and water conservation, reduced runoff and non-point sources of pollution, and good land stewardship.

10.4.1 Developed Areas Vegetation Management Objectives

- Provide for appropriate planting and maintenance based on site conditions and use.
- Employ conservation landscaping practices that result in energy savings, preservation of historic and specimen trees, manage stormwater and non-point sources of runoff, and reduced grounds maintenance costs.

- Reduce pesticide applications by 50% per unit of improved facilities by the year 2001 and by 75% by 2005 using 1994 as the baseline year.
- Implement initiatives or best management practices to reduce fertilizer/nutrient runoff.
- Maintain and enhance the health and value of landscape trees of the urban forest.
- Maintain a no net loss of urban tree cover to enhance and meet ecological, aesthetic, and conservation needs and objectives.

10.4.2 Developed Areas Vegetation Management Actions

1. Implement IPM for controlling pests and nutrient runoff in developed areas.

   - Incorporate IPM practices and techniques into grounds activities and the Real Property Maintenance Contract technical specifications.

   - Implement grounds maintenance cultural practices and standards in the cantonment area to reduce need and dependency on pesticides.

   - Establish best management practices for all organizations and contractors engaged in turf management and maintenance to control and reduce nutrient runoff from the golf courses and other turf areas.

   - Manage trees and landscapes on an individual basis to reduce fertilizer, pesticide and irrigation demands and applications.

   - Ensure that all approved fertilizers, lime and pesticides are properly stored and protected.

   - Conduct annual review and update to the Installation Integrated Pest Management Plan.

2. Implement turf management at levels and intensities necessary to meet the designated use, and to support the elements of the military mission.

   - Review turf mowing levels and areas annually to update specific site requirements, efficiency and compatibility with area use and natural resources. Note sites where mowing should be reduced or eliminated and make appropriate adjustments to GIS maps and contract specifications.

   - Turf areas are to be maintained employing current best management practices based on site conditions (not set schedules) and area use with the highest level of maintenance designated for major entrances, parade fields and major administrative buildings.

- Mow and maintain turf in improved grounds to a height of between 3 and 4.5 inches. Semi-improved grounds are to be maintained between 3 and 8 inches. There is to be no mowing in areas where turf and other vegetation is under severe moisture stress.

- In the goose management areas of Davison Army Airfield, grass is to be mowed no shorter than 7 to 14 inches. Begin mowing grass adjacent to the runways and finish in the infield or outermost grass areas. Do not mow grass adjacent to the runway shorter than in other areas.

3. Implement urban forest management practices to minimize tree loss from development and pests, and preserve historic and specimen trees.

   - Refer to Appendices I through L for current copies of *Fort Belvoir Tree Removal and Protection Policy Letter*, *Excavation Permit Policy Letter*, *Integrated Pest Management Policy Letter*, and the Fort Belvoir *Environmental Protection Specifications* applicable to construction contracts (which contains tree protection standards).

   - Shade trees are to be incorporated into all building and parking designs. Refer to the Fort Belvoir Installation Design Guide.

   - Maintain the two-to-one tree replacement policy.

4. Implement environmentally and economically beneficial landscaping.

   - Conservation landscaping practices are to be implemented. Native plant species are to be utilized for the majority of new plantings. Other considerations include water requirements, soils, and other existing site conditions that relate to plant survival and site compatibility. A list of recommended species for planting in included in Appendix M.

   - Identify annual requirements for landscape plantings as well as tree and shrub seedlings for site reclamation and restoration of native habitat. This includes terminated training areas, building demonstration sites, utility rights-of-way, and other areas suitable for habitat restoration.

   - Continue the mowing reduction program, which includes such actions as eliminating mowing, or reducing mowing frequency.

5. Expand education and outreach efforts to address the benefits of conservation landscaping and integrated pest management.

- A demonstration/education conservation landscape display will be established and maintained on Fort Belvoir. The living display will provide examples of beneficial landscapes for organizations and residents.

- Develop and maintain self-help instruction/technical brochures and training programs for Fort Belvoir personnel that identify procedures, materials and practices in regards to grounds maintenance, landscaping, and integrated pest management.

6. Implement landscaping techniques to control stormwater.

   - Enhance natural runoff/sediment collection basins to reduce the flow of sediment and other pollutants into waterways.

   - Develop a policy and program for planting and preserving trees around stormwater management ponds.

7. Continue to provide technical assistance for emergency situations, such as uncontrolled fires, that threaten developed areas vegetation resources, as needed.

8. Continue to respond to requests for technical information from on-post and off-post entities, as appropriate.

9. Continue to investigate and enforce violations of federal and state laws and regulations, as well as DoD, DA, and Fort Belvoir policies.